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# Weed Management Guide 1986

## FOR COMMERCIAL VEGETABLE GROWERS

*Restricted-use herbicides are identified with an asterisk(\*)*.

*You must be certified as a pesticide applicator to use restricted-use pesticides.*

*See your county Extension adviser in agriculture for information.*

**W**EED GROWTH reduces the income of vegetable growers in the United States by millions of dollars annually as a result of lower yields, poorer quality, and added labor in harvesting and processing.

This guide should be used together with the grower's knowledge of soil types and the crop and weed history of the area to be treated. Whether to use herbicides or other means of weed control depends in part on the severity of past weed infestations. In some instances, mechanical control may be sufficient. If so, shave off weeds with a sharp hoe or cultivator while gently breaking up the crust. Deep tillage causes severe injury to many shallow-rooted plants and helps place a fresh supply of weed seeds in position to germinate. Keeping equipment sharp and in good condition will help reduce injury to desirable plants. Hoe carefully around your plants, and hand pull weeds close to the plants.

For warm season crops such as fresh market tomatoes, peppers, eggplant, okra, cucumbers, and melon, black polyethylene mulch will control annual weeds, conserve moisture, and increase the soil temperature in early spring. The higher temperature increases early season growth. Natural mulch materials may require considerable hand labor for application. Most organic materials are bulky and must be hauled to the place of use. This is a problem for large commercial plantings. Organic mulches tend to reduce soil temperature.

Herbicide application may be needed in addition to mechanical control. Several herbicides may be suggested for some crops. These herbicides have shown good control with no injury to the vegetables under test conditions. Not all herbicides cleared for use on a species are necessarily listed. Where the choice of more than one herbicide is suggested, the decision rests with the grower and is based on his knowledge of past weed infestations, crop rotations, and material costs. Where one herbicide will not control the weeds present, a combination of herbicides may be suggested. When using a herbicide for the first time, it is advisable to use a small-scale trial.

These suggestions for weed control in vegetables are

based on research at the Illinois Agricultural Experiment Station, the U.S. Department of Agriculture, and other research institutions. The University of Illinois and its agents assume no responsibility for results from the use of herbicides, whether or not they were used in accordance with suggestions, recommendations, or directions of the manufacturer or any governmental agency.

*Reading the label of the herbicide container* is the most profitable time you spend in weed control. Use of the material and methods of application and use depend on registration of the herbicide by federal and state Environmental Protection Agencies (EPA). Do not use any herbicide *unless the label states that it is cleared for the use on the crop to be treated.*

Herbicides are being classified for *general use* or *restricted use* by the U.S. Environmental Protection Agency. A person wishing to use a herbicide classified for restricted use must be certified as a private or commercial pesticide applicator by the Illinois Department of Agriculture. Contact your county Extension adviser in agriculture for details about this program. Only a few herbicides have been classified at this time.

When applying mixtures of chemicals, the *user* assumes responsibility for freedom from residues if the mixture is not labeled by the EPA.

Suggestions sometimes change during the growing season, based on EPA clearances that were made after this circular was issued. This publication, printed once a year, is subject to change without notification.

Watch for notice of changes in the EPA registration of herbicides (as released by the EPA) in the *Illinois Vegetable Farmer's Letter* and the *Insect, Weed, and Plant Disease Survey Bulletin*. Subscription forms for the latter are available from the Agricultural Newsletter Service, 116 Mumford Hall, 1301 West Gregory Drive, Urbana, Illinois 61801, or your county Extension Office. You can obtain the *Vegetable Farmer's Letter* from Vegetable Crops Extension, University of Illinois, 1103 West Dorner Drive, Urbana, Illinois 61801. Some changes will be released through the Vegetable Growers "Hotline."

# For Application During the Growing Season (1986 Only)

| Crop   | Treatment                     | Active ingredient<br>per acre<br>actually covered <sup>a</sup> | Weeds<br>controlled   | Timing of application<br>(based on crop stage)   | Remarks, cautions, limitations  |
|--|-------------------------------|--|---|--|---|
| Asparagus<br>(seedlings)   | Amiben                        | 3 lb.  | Annuals   | Immediately after seeding  | Irrigation or rainfall after treatment will give maximum control.   |
| Asparagus<br>(established<br>plantings) <sup>b,c</sup>   | dalapon                       | 5-10 lb.   | Perennial grass   | End of harvest season<br>following disking   | Apply when grass weeds are 3 to 4 in. tall. Direct spray under fern growth. Use surfactant as directed on label.  |
|  | diuron                        | 1-4 lb.  | Annuals   | In spring, after harvest, or both  | Apply after disking. Do not exceed 6 lb. per grow season; use a lighter rate on sandy soil. With diuron Princep, a spring application may be sufficient after first year.                                       |
|  | Princep                       | 3-4 lb.  | Annuals   | In spring, after harvest, or both  | Apply after disking. Do not treat during the last year in asparagus because of residue.   |
|  | Sinbar                        | 1.2-2.4 lb.  | Annuals   | In spring, after harvest, or both  | Use lower rates on coarse soils. Do not apply more than 2.4 lb. per acre per year. Do not use on soils with less than 1 percent organic matter. Do not plant to any other crop for two years after application. |
|  | metribuzin                    | 1-2 lb.  | Primarily broad-<br>leaf weeds                              | Early spring before the<br>spears emerge or<br>after harvest   | Apply after disking. Do not apply within 14 days of harvest. Can help control broadleaf weeds when used with dalapon, diuron, or Princep. Do not apply more than 2 lb./acre per growing season.                 |
| Beans, dry,<br>lima and snap <sup>d</sup>  | Preemergence                  |  |   |  |   |
|  | Treflan                       | 0.5-0.75 lb.   | Annuals*<br>(primarily grasses)                             | Preplant soil application, incorporate with soil immediately   | Plant crop immediately, or within 3 weeks after application. Can use up to 1 lb. per acre on dry beans.   |
|  | Basalin                       | 0.75-1.5 lb.   | Annuals<br>(primarily grasses)                              | Preplant soil application, incorporate with soil immediately   |   |
|  | dinoseb                       | 6-7.5 lb.  | Annuals   | Can be used between planting and crop emergence  | Do not use on light, sandy soil. Some stand reduction may result from use. See label for precautions.   |
|  | Postemergence                 |  |   |  |   |
|  | Basagran                      | 0.75-1 lb.   | Annual broad-<br>leaf weeds,<br>Canada thistle,<br>nutsedge | When weeds are small and are actively growing; after the first trifoliate leaf appears on beans  | Can provide good, broad-spectrum control when combined with a grass-active herbicide. Do not mix with other pesticides. See Basagran entry under corn, postemergence for Canada thistle and nutsedge control.   |
| Beans, snap  | Amiben                        | 2-2.5 lb.  | Broad spectrum of annual weeds                              | Preemergence only  | Do not use on sandy soils or those with less than 1% organic matter.  |
|  | EPTC                          | 3 lb.  | Annual grasses and nutgrass <sup>f</sup>                    | Preplant soil application, incorporate with soil immediately   |   |
|  | Eptam Extra                   | 2-3 lb.  |   | Preplant soil application, incorporate with soil immediately   | Research results have shown this combination to control a broader spectrum of weeds than either herbicide alone.  |
|  | EPTC + Treflan                | 0.5-0.75 lb.   |   |  |   |
|  | Dacthal                       | 6-10 lb.   | Annuals*<br>(primarily grasses)                             | Immediately after seeding  | Do not feed treated plant parts to livestock.   |
| Beans, lima and dry  | Amiben                        | 2-3 lb.  | Broad spectrum of annual weeds                              | Immediately after seeding, or preplant-incorporated for lima beans   | Field may be rotary-hoed without destroying herbicide action.   |
|  | Dual                          | 1.5-3 lb.  | Annuals   | Preplant soil application, incorporate with soil, or pre-emergence   |   |
|  | Lasso                         | 2-3 lb.  | Annuals   | Lima beans: preplant soil application, incorporate into upper 1 to 2 inches, or pre-emergence. Dry beans: preplant soil application, incorporate into upper 1 to 2 inches, or preemergence |   |
| Beans, dry   | EPTC + Treflan                | 2-3 lb.  |   | Preplant soil application, incorporate with soil immediately   | Research results have shown this combination to control a broader spectrum of weeds than either herbicide alone.  |
|  |                               | 0.5-0.75 lb.   |   |  |   |
|  | Sonalan                       | 0.5-1.5 lb.  | Annual grass and nightshade                                 | Preplant soil application, incorporate with soil immediately   | Sonalan has a tank mix or overlay label for dry beans with Amiben, Dual, Eptam, Lasso, or Basagran.   |
| Beets, garden <sup>d</sup>   | Pyramin                       | 4 lb.  | Annuals<br>(primarily broadleaved)                          | Preemergence or after beets emerge and before weeds have two true leaves   | Rainfall or irrigation needed to activate. Where grasses are a severe problem, use 4 lb. of Pyramin plus 4 lb. of Ro-Neet.  |
|  | Ro-Neet                       | 4 lb.  | Annual grasses  | Preplant soil application, incorporate with soil immediately   | Use a combination treatment with Pyramin to broaden control spectrum.   |
| Broccoli <sup>d</sup><br>Brussels sprouts <sup>d</sup><br>Cabbage <sup>d</sup><br>Cauliflower <sup>d</sup> | Direct-seeded or transplanted |  |   |  |   |
|  | Treflan                       | 0.5-0.75 lb.   | Annuals*<br>(primarily grasses)                             | Preplant soil application, incorporate with soil immediately   | Stunting or growth reduction may occur at recommended rates under growth stress conditions. Can use up to 1 lb. per acre on transplants.  |
|  | Dacthal                       | 6-10 lb.   | Annuals*<br>(primarily grasses)                             | Immediately after seeding. Can also be incorporated preplant   |   |
| Broccoli Brussels sprouts Cauliflower  | Devrinol                      | 1-2 lb.  | Annuals   | Preplant soil incorporated   | Devrinol performs better when used in combination with a second herbicide than when used alone.   |

All notes are at the end of this table (page 6).

## For Application During the Growing Season (continued)

| Crop                          | Treatment  | Active ingredient<br>per acre<br>actually covered <sup>a</sup> | Weeds<br>controlled   | Timing of application<br>(based on crop stage)   | Remarks, cautions, limitations  |
|-------------------------------|--|--|---|--|---|
| Carrots <sup>d</sup>          | Preemergence<br>Treflan  | 0.5-1 lb.  | Annuals*<br>(primarily grasses)                                   | Preplant soil application,<br>incorporate with soil immediately  | Seed after application to 3 weeks later.  |
|                               | Postemergence<br>linuron   | 0.75-1.5 lb.   | Annuals   | Postemergence on carrots only<br>after the crop is 3 in. tall;<br>grasses, less than 2 in.; broad-<br>leaves, less than 6 in.                            | Do not feed treated foliage to livestock or replant treated<br>area for 4 months. More than one application may be<br>made, but do not exceed a total of 2 lb. per acre. Do<br>not use over 40 PSI. Use no surfactants when tempera-<br>tures exceed 80°F., or crop injury may result.  |
|                               | Stoddard<br>Solvent  | 60-80 gal.   | Annuals   | After two true leaves have<br>appeared (do not apply to<br>carrots or parsnips after they<br>are 1/4 in. in diameter, since<br>an oily taste may result) | Most effective when sprayed on cloudy days or during<br>high humidity, and when weeds are not more than 2 inches<br>high. May not control ragweed. Do not apply within 40<br>days of harvest. Can be used on celery, dill, parsnips, and<br>parsley.  |
| Corn, pop <sup>d</sup>        | Preemergence<br>atrazine   | 2-3 lb.  | (See sweet corn)  | (See sweet corn)   | See sweet corn, <i>except the section on preemergence com-<br/>binations.</i>   |
|                               | Bladex   | (See remarks)  | Annuals   | Preemergence only  | Some pop corn varieties are sensitive to the application<br>rate. (See remarks on Bladex under sweet corn.)   |
|                               | Dual   | 1.5-3 lb.  | Annuals   | Preplant soil application,<br>incorporate with soil,<br>or preemergence  |   |
|                               | Eradicane,<br>Eradicane Extra  | 4-6 lb.  | Difficult-to-control<br>weeds                                     | Preplant soil application,<br>incorporate with soil  | See sweet corn.   |
|                               | Lasso  | 2-4 lb.  | Annuals   | Preemergence   | See sweet corn.   |
|                               | Princep  | 2-4 lb.  | Annuals   | Preemergence   | Plant only crops so specified on the label the following<br>year. Do not graze treated areas.   |
|                               | Sutan+   | 3-4 lb.  | Primarily<br>annual grasses                                       | Preplant soil application,<br>incorporate with soil  | See sweet corn.   |
|                               | Postemergence<br>2,4-D   | 0.5 lb.  | Broadleaved<br>weeds  | Postemergence  | Apply when corn is 3 to 10 in. tall.  |
|                               | Basagran   | 0.75-1 lb.   | Broadleaved an-<br>nual weeds,<br>Canada thistle,<br>and nutsedge | (See sweet corn)   | (See sweet corn)  |
| Corn,<br>sweet <sup>c,d</sup> | Preemergence<br>atrazine   | 2-3 lb.  | Annuals, annual<br>and perennial<br>grasses <sup>h</sup>          | Preemergence, apply no later<br>than 3 weeks after seeding.<br>Shallow cultivation may im-<br>prove weed control during<br>dry weather.                  | Grow corn a second year without atrazine treatment. This<br>chemical has a high soil residue. Do not plant other vege-<br>table crops on a sprayed area until a second year of corn<br>has been grown. Use atrazine where quackgrass is a prob-<br>lem. Residue hazard decreased when banded or in com-<br>bination with Lasso, propachlor, or Sutan.   |
|                               | Bladex   | (See remarks)  | Annuals   | Preemergence only  | Some sweet corn varieties are sensitive to the application<br>rate. Has been shown to have less soil residue than atra-<br>zine. See label for rates and precautions. Do not use post-<br>emergence, or on sandy or loamy-sandy soils (under 1<br>percent organic matter). Can be combined with other<br>herbicides to reduce the rate being used. NOTE: The<br>Shell Chemical Co. has a bulletin on using Bladex on pop<br>and sweet corn. |
|                               | Dual   | 1.5-3 lb.  | Annuals   | Preplant soil application,<br>incorporate with soil,<br>or preemergence  |   |
|                               | Eradicane,<br>Eradicane Extra  | 4-6 lb.<br>4 lb.   | Difficult-to-control<br>weeds                                     | Preplant soil application,<br>incorporate with soil  | Use to control weeds that are difficult to control with<br>other herbicides, such as wild cane, nutsedge, quackgrass,<br>wild Proso millet, and seedling Johnsongrass. Eradicane<br>Extra contains an "extender" which may lengthen the<br>period of control in fields where Eradicane control has<br>been shortened after several years of continuous use.   |
|                               | Lasso  | 2-4 lb.  | Annuals   | Preemergence   | Preplant incorporation may aid control of nutgrass.   |
|                               | propachlor   | 4-6 lb.  | Annuals   | Preemergence   | Do <i>not</i> use on sandy soils. Is an excellent herbicide on<br>soils with a high organic-matter content.   |
|                               | butylate +   | 3-4 lb.  | Primarily<br>annual grasses                                       | Preplant soil application,<br>incorporate with soil  | Especially useful on sandy soil and where nutgrass is a<br>problem.   |
|                               | Combinations<br>Dual, Eradicane, Eradicane Extra, Lasso, propachlor, and Sutan+ may be combined with atrazine or Bladex or Basagran to broaden<br>the spectrum of weed control and reduce residue and carryover. See labels of herbicides for rates and application methods. |  |   |  |   |
|                               | Postemergence<br>2,4-D<br>(amine)  | 0.5 lb.  | Broadleaved<br>weeds  | Postemergence  | Preferably, apply before corn is 6 in. tall. If corn is over<br>12 in., reduce the rate to 1/4 lb.  |
|                               | Corn continued on the next page.   |  |   |  |   |

All notes are at the end of this table (page 6).



## For Application During the Growing Season (continued)

| <i>Crop</i>   | <i>Treatment</i>  | <i>Active ingredient<br/>per acre<br/>actually covered<sup>a</sup></i> | <i>Weeds<br/>controlled</i>                                  | <i>Timing of application<br/>(based on crop stage)</i>   | <i>Remarks, cautions, limitations</i>  |
|---|---|--|--|--|--|
| Corn,<br>sweet<br>(continued) <sup>c,d</sup>  | atrazine  | 2 lb.  | Annuals, annual<br>and perennial<br>grasses <sup>b</sup>     | Directed spray 3 weeks<br>after emergence  | Can be combined with crop oils for postemergence application as emergency measure. This may increase residue the following year; preemergence use preferred. Do not graze or feed treated foliage for 21 days after treatment.   |
|   | Basagran  | 0.75-1 lb.   | Broadleaved annual weeds,<br>Canada thistle,<br>and nutsedge | Early postemergence when the<br>weeds are small and actively<br>growing. Delay will result in<br>less control.                 | For Canada thistle and nutsedge, split applications are preferred. Make the first one when the plants are 6 to 10 in. tall; for nutsedge, 7 to 10 days later; for Canada thistle, 10 to 14 days later (or use one application per cultivation). Do not mix with other pesticides.  |
| Cucumbers<br>Muskmelons <sup>c</sup><br>Watermelons <sup>c</sup>  | Alanap L  | 3-5 lb.  | Annuals <sup>f</sup>   | Immediately after seeding<br>or transplanting  | Do not use on cold soil. Rainfall or irrigation after treatment gives maximum control.   |
|   |   | 3-3.5 lb.  |  | After transplanting or vining  | Keep away from foliage. Apply to soil after the weeds have been removed.   |
|   | Amiben  | 2-3 lb.  | Annuals  | Direct-seeded application<br>of a spray  | Use only when protected by an application of activated carbon. See Amiben label for other instructions.  |
|   | Prefar  | 4-6 lb.  | Annuals<br>(primarily grasses)                               | Preplant soil application,<br>incorporate with soil<br>immediately   | Is primarily a grasskiller. Consult label for sensitive crops within 18 months after application. Can be used in rotation with tomatoes, broccoli, cauliflower, lettuce, carrots, onions, and summer squash within 18 months. Soybeans can be planted 12 months after application. |
|   | Prefar<br>plus Alanap L   | 4 lb.<br>+2-3 lb.  | Grasses and<br>broadleaved<br>weeds                          | Preplant light incorporation   | Has value for broad-spectrum weed control. Consult label for sensitive crops within 18 months after Prefar application. Has EPA approval as a tank mixture.  |
|   | Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring. |  |  |  |  |
| Eggplant  | Dacthal   | 6-10 lb.   | Annuals <sup>f</sup><br>(primarily grasses)                  | After plants are established,<br>4-6 weeks after transplanting   | Cultivate and weed prior to application. Can be applied to plants as part of a uniform soil application.   |
|   | Devrinol  | 1-2 lb.  | Annuals  | Preplant soil incorporation  | For use in transplanted eggplant.  |
| Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring. |   |  |  |  |  |
| Greens<br>(for beets,<br>mustard<br>greens, and<br>spinach —<br>see note d)   | Dacthal   | 6-10 lb.   | Annuals <sup>f</sup><br>(primarily grasses)                  | Immediately after seeding  | For use on collards, kale, mustard greens, and turnips.  |
|   | Treflan   | 0.5-0.75 lb.   | Annuals <sup>f</sup><br>(primarily grasses)                  | Preplant soil application, in-<br>corporate with soil immediately  | For use on collards, kale, mustard greens, and turnip greens.  |
|   | Furloe  | 1-2 lb.  | Primarily broad-<br>leaved annuals                           | Preemergence   | For spinach only. Use lower rates in cool, wet weather.  |
| Horseradish <sup>d</sup>  | Dacthal   | 6-10 lb.   | Annuals <sup>f</sup><br>(primarily grasses)                  | Immediately after<br>transplanting   |  |
| Lettuce <sup>c,d</sup>  | Balan   | 1.5 lb.  | Annuals  | Preplant soil incorporation<br>Incorporate with soil<br>immediately  | Is primarily a grasskiller. Seed after application to 3 weeks later. Do not plant wheat, barley, rye, grass, onions, oats, beets, or spinach for 12 months after application.  |
|   | Kerb  | 1-2 lb.  | Annuals  | Preemergence or preplant-<br>incorporated  | Do not use when the air temperature exceeds 85° F. Use the lower rates listed on sandy soil. Do not use on peat or muck soils. See label for rotation crops. For best results, rainfall or irrigation is needed 1 to 2 days after application, especially during warm weather.     |
| Okra <sup>d</sup>   | Dual  | 1.5-3 lb.  | Annuals  | Preplant soil application,<br>incorporate with soil,<br>or preemergence  |  |
|   | Enide   | 3-5 lb.  | Annuals  | At planting  |  |
|   | Treflan   | 0.5-1 lb.  | Annuals<br>(primarily grasses)                               | Preplant soil application,<br>incorporate with soil<br>immediately   |  |
| Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring. |   |  |  |  |  |
| Onions <sup>b</sup>   | Preemergence  |  |  |  |  |
|   | Dacthal   | 6-10 lb.   | Annuals <sup>f</sup><br>(primarily grasses)                  | Immediately after seeding<br>or transplanting  | May not kill smartweed or common ragweed. Can be used on seeds, sets, or seedlings. Use only on mineral soils. Use lower rates on sandy soils. A double application of Dacthal can be used at seeding, layby, or both.   |
|   | Postemergence   |  |  |  |  |
|   | Goal  | 0.12 lb.   | Broadleaved<br>weeds   | Postemergence after onions<br>have 2 true leaves or to trans-<br>plants. Best control when weeds<br>are in 2- to 4-leaf stage. | Multiple applications may be made, but do not exceed 0.5 lb. per season. Use in combination with a preemergence grass herbicide.   |
|   | Furloe  | 3-6 lb.  | Broadleaved<br>weeds (especially<br>smartweed)               | On seeded onions:<br>loop stage or after 3- to<br>4-leaf stage   | In later sprays, direct at base of onion plant. If applied more than once, do not exceed 6 lb. per acre for the season. Use lower rates in cool, wet weather. Use no later than 30 days before harvest. Do not use on sandy soils.   |
|   | Brominal  | 0.25-0.38 lb.  | Broadleaved<br>weeds   | When onions have 2 to 5<br>true leaves   | Use 50 to 70 gallons of water per acre. Apply when onion foliage is dry for greatest crop safety. Suggested temperature for spraying is 80° F with low humidity.   |

All notes are at the end of this table (page 6).

## For Application During the Growing Season (continued)

| <i>Crop</i>                       | <i>Treatment</i>                         | <i>Active ingredient<br/>per acre<br/>actually covered<sup>a</sup></i> | <i>Weeds<br/>controlled</i>                                   | <i>Timing of application<br/>(based on crop stage)</i>   | <i>Remarks, cautions, limitations</i>   |
|-----------------------------------|--|--|---|--|---|
| Peas <sup>d</sup>                 | Preemergence<br>propachlor               | 4-5 lb.  | Annuals   | Preemergence   | Do not use on sandy soil.   |
|                                   | Treflan                                  | 0.5-0.75 lb.   | Annuals*  | Preplant soil incorporation,<br>incorporate with soil<br>immediately                                       | Seed after application to 3 weeks later. Some reduction<br>of growth and stand reduction possible under stress. May<br>suppress some root rot.  |
|                                   | Treflan<br>+<br>Surflan                  | 0.5 lb.<br>+<br>0.5 lb.  | Annuals   | Preplant soil application,<br>incorporate with soil<br>immediately   | Do not use on soils of less than 1.5 percent organic<br>matter. May suppress Aphanomyces root rot. May<br>broaden weed control more than either herbicide alone.<br>Do not feed forage to livestock. Do not plant any root<br>crop for 12 months after application.   |
|                                   | Basalin                                  | 0.5-0.75 lb.   | Annuals<br>(primarily grasses)                                | Preplant soil application,<br>incorporate with soil<br>immediately   |   |
|                                   | Dual                                     | 1.5-3 lb.  | Annuals   | Preplant soil application,<br>incorporate with soil,<br>or preemergence                                    |   |
|                                   | Preemergence or Postemergence<br>dinoseb | 0.3-9 lb.  | Annuals<br>(primarily broad-<br>leaved weeds)                 | Preemergence or<br>postemergence   | Preemergence, use 6 to 9 lb.; postemergence, use 0.3<br>to 1.1 lb. Apply prior to bloom when peas are 2 to 8 in.<br>tall. See label for further precautions. Preemergence use<br>may help suppress root rot.  |
|                                   | Postemergence<br>Basagran                | 0.75-1 lb.   | Annual broad-<br>leaved weeds,<br>Canada thistle,<br>nutsedge | When weeds are small and are<br>actively growing; after peas<br>have 3 pairs of leaves (or<br>4 nodes)     | Can help control Canada thistle. Can provide good, broad-<br>spectrum control when used with a grass-active herbicide.<br>Do not mix with other pesticides. See Basagran entry<br>under corn, postemergence for Canada thistle and nut-<br>grass control. Do not use crop oil.  |
|                                   | MCPB                                     | 1 lb.  | Broadleaved<br>weeds and<br>Canada thistle                    | When peas are 3-7 in.<br>tall and no later than 4<br>nodes prior to pea blossom                            | May delay maturity 1 to 4 days. Use at least 20 gallons<br>of water per acre. Do not feed vines to livestock.<br>MCPA is more effective on mustard. MCPB or Vacate<br>may be less injurious to peas.  |
|                                   | MCPA<br>(Na salt)                        | 0.25-0.5 lb.   |   |  |   |
|                                   | Vacate<br>(MCPA amine)                   | 0.115-0.154<br>lb.   |   |  |   |
| Potatoes,<br>Irish <sup>e,d</sup> | Dual                                     | 1.5-3 lb.  | Annuals   | Drag-off treatment<br>at emergence   | Labeled for use in a tank mix with Lorox.   |
|                                   | EPTC                                     | 3-6 lb.  | Annual grasses<br>and nutgrass <sup>f</sup>                   | Drag-off treatment at emer-<br>gence or preplant soil<br>application; incorporate<br>with soil immediately | Use lower rate on sandy soil.   |
|                                   | Treflan                                  | 0.5-1 lb.  | Annuals*<br>(primarily grasses)                               | Drag-off treatment at<br>emergence   | Use a light incorporation.  |
|                                   | linuron                                  | 0.75-2 lb.   | Annuals   | Apply prior to potato<br>emergence   | Plant tubers at least 2 in. deep. Do not replant treated area<br>to other crops for 4 months after treatment. May injure<br>crop on light, sandy soil. Do not apply over exposed tubers.<br>Labeled for use in a tank mix with Dual.  |
|                                   | dalapon                                  | 7 lb.  | Quackgrass  | Before plowing in spring;<br>wait 4 days before plowing<br>and planting                                    | Not for fields intended for red-skinned varieties or White<br>Rose. Do not plant potatoes for 4 weeks. Use surfactant<br>as directed on label.  |
|                                   | metribuzin                               | 0.25-0.5 lb.   | Annuals<br>(primarily<br>broadleaved)                         | Postemergence, following a<br>preemergence grass<br>herbicide  | Can be used preemergence also. Do not exceed 1 lb.<br>per acre in a season. Do not apply within 60 days of<br>harvest. Do not use on red-skinned or early-maturing<br>white varieties. Do not apply in cool, wet weather.   |
|                                   | Prowl                                    | 0.75-1.5 lb.   | Annuals   | Drag-off treatment<br>at emergence   | Use a light incorporation within 7 days. May be com-<br>bined with Sencor/Lexone, EPTC, or linuron.   |
|                                   | Surflan                                  | 0.75-1 lb.   | Annuals   | Postemergence  | May be tank mixed with metribuzin for broader control.  |
|                                   | Dacthal                                  | 6-10 lb.   | Annuals*<br>(primarily grasses)                               | Immediately after planting   |   |
| Potatoes,<br>sweet <sup>b</sup>   | Amiben                                   | 3 lb.  | Annuals   | Immediately after planting   | Do not plant nonapproved crops on treated soil during the<br>same season.   |
|                                   | Enide                                    | 4-6 lb.  | Annuals   | Immediately after trans-<br>planting   |   |
| Squash<br>Pumpkins                | Amiben                                   | 3-4 lb.  | Annuals   | As soon after seeding as<br>possible, or preplant-<br>incorporated   | Use on loam soils. Amiben can be applied broadcast or<br>banded over the row in pumpkins.   |
|                                   | Prefar                                   | 4-6 lb.  | Annuals<br>(primarily grasses)                                | Preplant soil application,<br>incorporate with soil<br>immediately   | Use on sandy soils. Is primarily a grasskiller. Consult<br>label for sensitive crops within 18 months after applica-<br>tion. Can be used in rotation only with tomatoes, broccoli,<br>cauliflower, lettuce, carrots, onions, and summer squash<br>within 18 months of application. Soybeans can be planted<br>12 months after application. |

All notes are at the end of this table (page 6).

## For Application During the Growing Season (continued)

| Crop  | Treatment  | Active ingredient<br>per acre<br>actually covered <sup>a</sup> | Weeds<br>controlled   | Timing of application<br>(based on crop stage)   | Remarks, cautions, limitations   |
|---|------------|--|---|--|--|
| Pumpkins  | propachlor | 4-5 lb.  | Annuals   | Preemergence   | Do not use on sandy soils. For use on processing pumpkins only. Do not use on "jack-o-lantern" type pumpkins.  |
| Rhubarb <sup>c</sup>  | paraquat*  | (See following table)  |   |  |  |
| Tomatoes,<br>direct-seeded<br>and trans-<br>planted <sup>e</sup>  | Enide      | 4-6 lb.  | Annuals   | Preemergence   | Do not plant other food crops on treated areas for 6 months. If used under dry soil conditions, a shallow (in.) incorporation as a preplant treatment may improve weed control. Can also be used on transplanted peppers.  |
|   | Devrinol   | 1-2 lb.  | Annuals   | Preplant soil incorporated   | Also used on direct-seeded and transplanted peppers. Enide + Devrinol is labeled as a tank mixture.  |
|   | Amiben     | 3-4 lb.  | Annuals   | Direct-seeded tomato plants must have 5-6 true leaves; transplants must be established | Use granular formulation and apply to dry foliage to avoid leaf burn. Do not use on sandy soils.   |
|   |            | 2-3 lb.  | Annuals   | Direct-seeded application of a spray application                                       | Use only when protected by a band application of a mixture of activated carbon plus vermiculite. See Amiben label for other use and application instructions.  |
|   | metribuzin | 0.25-1 lb.<br>(min.-max.)                                      | Primarily broad-leaf. Should be used with a grass-active herbicide. | Preplant incorporated. Post-emergence, can be broadcast or directed.                   | Apply with ground equipment to seeded and transplanted tomatoes. Do not use air-blast or other high-pressure spray equipment. Do not use on peppers.   |
|   |            | 0.25-0.5 lb.   |   | Preplant incorporated, transplant tomatoes   | Alone or in a tank-mix combination with Treflan.   |
|   |            | 0.25-0.5 lb.   |   | Broadcast spray, established tomatoes  | Single or multiple applications. Minimum of 14 days between treatments. Direct-seeded plants should have 5 or 6 leaves; transplants should show new growth.  |
|   |            | 0.5-1 lb.<br><br>(For min.-max. rates)                         |   | Directed spray, established tomatoes   | Recommended for use in fields with severe weed problems, or for fields with hard-to-control weeds. Do not apply within 7 days of harvest, or within 3 days following cool, wet, or cloudy weather; otherwise, crop injury may occur. Do not apply to established tomatoes within 24 hours after application of other pesticides. Do not apply more than 1 lb./acre per crop season, or more than 1 lb./acre within a 35-day period. Allow at least 14 days between applications, regardless of the dosage or method used. Do not use hot caps on tomatoes within 7 days before application, or at any time afterward. Do not tank-mix with other pesticides, except Treflan. |
| Tomatoes and Peppers, transplanted  | Treflan    | 0.5-1 lb.  | Annuals*<br>(primarily grasses)                                     | Preplant soil application, incorporate with soil immediately                           | Some reduction of growth may be possible under growth stress conditions, or if rates are higher than suggested for the soil type.  |
| Where earliness is desired, black polyethylene mulch can be used as an alternative to herbicides. It will control annual weeds, conserve moisture, and increase the soil temperature in early spring. |            |  |   |  |  |

**\* Restricted-use herbicide.**

<sup>a</sup> Based on active ingredients (actual amount of active herbicide in material or acid equivalent). Use lower rate on sandy soil and higher rate on clay and loam soils. When using a band application over the row, adjust amount of material applied to the part of an acre treated. <sup>b</sup> For perennial weed control, applications during and outside the growing season, see the following table. <sup>c</sup> For stale seedbeds, before crop emergence, see the following table. <sup>d</sup> For perennial grass control, applications outside the growing season, see the following table. <sup>e</sup> May not control ragweed and panicum. <sup>f</sup> May not control smartweed. <sup>g</sup> May not control ragweed, smartweed, and velvetleaf. <sup>h</sup> May not control crabgrass.

## For Application Outside the Growing Season

|   |           |   |                           |  |   |
|---|-----------|---|---------------------------|--|---|
| Asparagus   | paraquat* | Stale seedbed, before crop emergence<br>0.5-1 lb. | All emerged green foliage | Before crop emergence; allow maximum weed emergence prior to treatment   | Weeds that emerge after treatment will not be controlled. Crop plants that have emerged at application will be injured. Do not apply within 18 months of harvest. Use with a preemergence or preplant sustained-action weed control system. |
| Rhubarb   | paraquat* | 0.5-1 lb.   | All emerged green foliage | Before crop emergence; allow maximum weed emergence prior to treatment but apply before dormant rhubarb buds in crown begin to grow. | Weeds that emerge after treatment will not be controlled.   |
| Corn, sweet<br>Lettuce<br>Melons<br>Peppers<br>Potatoes<br>Tomatoes | paraquat* | 0.5-1 lb.   | All emerged green foliage | Before crop emergence  | Weeds that emerge after treatment will not be controlled. Crop plants that have emerged at application will be injured. Use with a preemergence or preplant, sustained-action weed control system.  |

**\* Restricted-use herbicide. CAUTION:** Special care should be taken when handling paraquat (Paraquat and Gramoxone). Wear rubber or neoprene gloves, a dual cartridge respirator, and an eye shield. Prevent all contact with skin and eyes. Follow closely all precautions outlined on the product label.



## For Application Outside the Growing Season (continued)

| Crop                | Treatment               | Active ingredient<br>per acre<br>actually covered*                                    | Weeds<br>controlled | Timing of application<br>(based on crop stage)                           | Remarks, cautions, limitations  |
|---------------------|-------------------------|---|---------------------|--|---|
| Asparagus           | Roundup                 | Perennial weed control, applications during and outside the growing season<br>2-5 lb. | (See remarks)       | Before emergence, or with shielded or directed sprays during fern growth | Use to control milkweed, thistle, field bindweed, quackgrass, or Johnsongrass. Apply to quackgrass when it is 6-8 in. tall in the fall or spring. Apply to Johnsongrass when it is at least 12 in. tall and actively growing. Do not till for the specified time for each species (see label). Does not provide residual weed control. Do not mix, store, or apply Roundup spray solutions in containers or spray tanks made of galvanized or unlined steel (except stainless steel). |
| Asparagus           | Roundup                 | Perennial grass control, applications outside the growing season<br>2-3 lb.           | (See remarks)       | (See remarks)  | Use for quackgrass or Johnsongrass control. Apply to quackgrass when 6 to 8 in. tall in fall or spring. Apply to Johnsongrass when at least 12 in. tall and actively growing. Do not till until 3 to 7 days after application. Does not provide residual weed control. Do not mix, store, or apply Roundup spray solutions in galvanized steel or unlined steel containers (except stainless steel).  |
| Beans, edible       |                         |   |                     |  |   |
| Beet greens         |                         |   |                     |  |   |
| Beets, red          | Kale                    |   | Radishes            |  |   |
| Broccoli            | Lentils                 |   | Spinach             |  |   |
| Cabbage             | Lettuce                 |   |                     |  |   |
| Cauliflower         | Mustard greens          |   |                     |  |   |
| Corn, sweet and pop | Okra                    |   |                     |  |   |
| Horseradish, as a   | Onions                  |   |                     |  |   |
| weed and as a crop  | Peas                    |   |                     |  |   |
| Jerusalem artichoke | Potato, Irish and sweet |   |                     |  | For control of volunteer horseradish, apply 3 to 4 lb. in mid-September. Field should have been disced 4 to 6 weeks prior to application. For this control practice, use spray coverage only.   |

NOTE: In the suggestions in this publication, trade names of herbicides are usually used. The list below shows trade names and their corresponding common names.

Restricted-use herbicides are identified with an asterisk (\*).

| Common name      | Trade name                 | Common name     | Trade name        | Common name       | Trade name            |
|------------------|----------------------------|-----------------|-------------------|-------------------|-----------------------|
| alachlor         | Lasso                      | diphenamid      | Enide             | napropamide       | Devrinol              |
| atrazine         | AAtrex and Atrazine        | diuron          | Karmex and others | naptalam          | Alanap L              |
| benfen           | Balan                      | ethalfluralin   | Sonalan           | paraquat*         | Paraquat,* Gramoxone* |
| bensulide        | Prefar                     | EPTC            | Eptam, Genep      | pendimethalin     | Prowl                 |
| bentazon         | Basagran                   | EPTC + extender | Eptam Extra       | pronamide         | Kerb                  |
| bromoxynil       | Brominal                   | EPTC+safener    | Eradicane         | propachlor        | Ramrod, Propachlor    |
| butylate+safener | Genate+, Sutan+            | EPTC + safener  |                   | pyrazon           | Pyramin               |
| chloramben       | Amiben                     | + extender      | Eradicane Extra   | oryzalin          | Surflan               |
| chlorpropham     | Furloe                     | fluchloralin    | Basalin           | oxyfluorfen       | Goal                  |
| cyanazine        | Bladex                     | glyphosate      | Roundup, Kleen Up | simazine          | Princep               |
| cycloate         | Ro-Neet                    | linuron         | Lorox, Linex      | terbacil          | Sinbar                |
| dalapon          | Dowpon                     | MCPA, MCPB      | Vacate, numerous  | trifluralin       | Treflan               |
| DCPA             | Dacthal                    | metolachlor     | Dual              | Petroleum solvent | Stoddard Solvent      |
| dinoseb          | Premerge-3, Sinox, Dinoseb | metribuzin      | Lexone, Sencor    | 2,4-D (amine)     | (numerous)            |

### Storing Pesticides and Containers

Keep pesticides and containers in a separate building, room, or enclosure used only for this purpose. Such building or rooms should be dry, ventilated, and locked. Fence outside storage areas to protect children and animals and to discourage pilferage. CAUTION: Do not store weedkillers, herbicides, or defoliant in the same room with insecticides. Chlorate salts can create a fire or explosion hazard. Remove only the pesticides needed for one day's operation and return empty containers — and any unused pesticide — to the storage area each day.

### Disposing of Pesticides and Containers

**Surplus pesticides.** To dispose of surplus pesticide mixtures, try to find other areas with the same pest problem and use up any extra tank mix or rinse water on these areas. Do not drain surplus pesticides in any location where they can contaminate wells, streams, rivers, lakes, or ponds.

Operators of landfills meeting environmental safety standards can obtain supplemental permits to handle toxic waste materials, including pesticides. To dispose of large quantities of surplus pesticides, contact the Illinois EPA Division of Land Pollution Control to locate the nearest landfill with a supplemental permit for toxic waste or to obtain specific instructions about disposal.

**Pesticide containers.** All empty pesticide containers, regardless of their type, should be rinsed three times before disposal. Rinse water should be dumped in the tank. Triple-rinsed containers should be punctured or broken to facilitate drainage and to prevent reuse for any purpose. They should then be hauled to a sanitary landfill for dis-

posal. Small quantities of containers may be buried singly in open fields, with due regard for the protection of surface and subsurface water.

Illinois regulations permit the burning of combustible containers provided that they are burned on the premises where they were used, that they are burned more than 1,000 feet from residential areas, that the burning will not cause undue visibility or environmental hazards, and that no reasonable alternative disposal method is available.

Do not breathe smoke from burning pesticide containers, and do not burn containers that have weedkillers such as 2,4-D or similar herbicides. When these change to a gas, the vapors may damage nearby crops and shrubbery. Pesticides containing chlorates may explode when heated and therefore should not be burned.

**CAUTION:** Banvel (dicamba), 2,4-D, and related chemicals (phenoxys) may seriously damage crops of grapes, tomatoes, other broadleaf vegetables, fruit trees, and ornamental plants. Spray only on tolerant crops. Before starting, survey the area for desirable plants that might be damaged by the herbicide. Spraying 2,4-D and Banvel close to a susceptible crop poses a serious threat. Sprays may drift up to a mile under certain conditions.

Spray on calm days or when there is a light breeze away from the susceptible crop. Use as low a pressure as possible to reduce drift. Use nozzles that produce large droplets or antidrift additives. Use the amine formulations to reduce the possibility of vapor drift. Use mechanical methods of weed and brush control where the spray risk is high.

Use a special sprayer for herbicides such as 2,4-D. Such chemicals are almost impossible to remove completely from a sprayer, and the remaining traces may contaminate other solutions and damage susceptible crops.

### **Growers with Several Crops in a Small Area**

Growers with several crops in a small area should be especially careful when applying herbicides. The tendency is to apply more if the quantity measured out "looks" as if it is not enough. A low-percentage granular formulation is suggested for small areas. *Check rates and application techniques on the container label very carefully. Applications must be accurate and uniform. Excessive amounts may cause injury to present or subsequent crops.*

Ideally, a specific herbicide should be fitted to a specific crop species. When growing several different crops in a small area, however, it is often impractical and expensive to use all the appropriate herbicides. Following are two herbicides that can be used on a wide range of vegetables.

**Dacthal.** Dacthal is cleared on a large number of vegetables. As listed in this circular, it may not always be the herbicide of preference. It can be used on broccoli, brussels sprouts, cauliflower, cabbage, snap beans, mung beans, Southern peas, soybeans, seeded melons, cucumbers, squash, collards, kale, mustard greens, turnips (root and greens), garlic, horseradish, onions, potatoes (Irish), sweet potatoes and yams, tomatoes, eggplant, peppers, and strawberries. *Do not use on beets or Swiss chard.* Dacthal is a preemergence herbicide that must be applied to weed-free soil. It controls very small weed seedlings soon after the weed seeds germinate. It is most effective if rainfall occurs or if the soil is irrigated within 2 to 3 days after application.

A one-time application to all species is not always possible because some plants are susceptible to injury in early-growth stages. It is preferable to use Dacthal at seeding or transplanting time if the species is adapted to it. When this is not possible, the weeds should be removed and Dacthal applied to prevent further weed development. Consult the label for the appropriate application time. Dacthal is effective in controlling annual grasses that are a problem in the spring. Broadleaf weeds that escape control should be mechanically removed.

**Treflan.** Treflan is widely available because it is used in soybean culture in Illinois. It can be purchased as a liquid with 4 pounds of active ingredient per gallon for large garden areas or as a low-percentage granular formulation for smaller areas. The amount of Treflan to use correlates very closely with the type of soil. The appropriate amounts are shown on the container label. Treflan can be used for weed control in beans (green, lima, and dry), broccoli, brussels sprouts, cabbage, cauliflower, carrots, kale, mustard greens, okra, peas, peppers, tomatoes, and turnip greens. *Treflan may injure sweet corn.*

*Treflan must be mixed with or watered into the soil to prevent loss of the chemical from the soil surface.* A rototiller, disc, or similar implement should be used to mix Treflan with the soil to a 3- to 4-inch depth. When it is impractical to mix Treflan with the soil mechanically, remove all germinated and growing weeds and allow the herbicide to be carried into the soil through rainfall or sprinkle irrigation. Treflan is quite effective on annual grasses, but many broadleaf weeds will need to be mechanically removed.

### **Mulches — see paragraph 3, page 1**

### **Other Publications on Weed Control**

Copies of other publications on weed control are available from the office of your county Extension adviser in agriculture and the Office of Agricultural Publications, 47 Mumford Hall, 1301 West Gregory Drive, Urbana, Illinois 61801.